

SECTION III.—FORECASTS.

FORECASTS AND WARNINGS FOR MAY, 1915.

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GENERAL PRESSURE DISTRIBUTION OVER THE UNITED STATES AND CANADA, INCLUDING THE SANDWICH AND ALEUTIAN ISLANDS, ALASKA, AND THE WESTERN PORTION OF THE MIDDLE ATLANTIC OCEAN.

Pressure was low at Honolulu during the greater portion of the month, especially during the first nine days, with the greatest depression from the 4th to 6th, inclusive. Over the Aleutian Islands high pressure prevailed until the 12th, and low pressure thereafter until the 26th, at which time there was a rise for three days. The extremes, however, were not marked. Over northern Alaska high pressure prevailed almost continuously throughout the month with the principal crest on the 5th, and somewhat lesser ones on the 12th and 16th. Over southern Alaska conditions were reversed to a certain extent and low pressure was the rule after the first five days of the month, this condition extending to a greater or less extent eastward over Alberta. From Manitoba eastward through the Province of Ontario low pressure prevailed generally during the first decade of the month with a minimum on the 7th and 8th, but afterwards moderately high pressure ruled. From the Province of Quebec eastward low pressure prevailed generally, except for brief intervals at the end of each decade of the month.

Pressure over the United States was characterized by persistent low pressure in the Plateau region and the Atlantic and Gulf States, with the same brief interruptions of moderately high pressure that characterized the distribution over northeastern Canada. Over the great basin of the country pressure was low until the 8th, and more or less irregular after that time. Over the western Atlantic Ocean low pressure predominated largely.

The persistent low pressure over much of the United States and the absence of well-defined high areas combined to make the month one of much uncertainty so far as the various special warnings were concerned. Quite often a certain pressure distribution would indicate the necessity of storm warnings on the Lakes, or the Ocean, or the Gulf coasts, but 12 hours later there would be such an entire change in distribution as to necessitate the lowering of the warnings. No severe storms occurred, but there were occasional moderately high winds of brief duration for many of which warnings were ordered, but without satisfactory results, because, as stated before, the rapid change in pressure conditions would necessitate their lowering within 12 hours.

The same difficulty frequently attended the forecasting of frosts over the northern sections, as the rapid shift of pressure conditions would sometimes result in rising pressure with clearing weather and attendant frosts within a few hours, while at other times high pressure with low temperatures that indicated the occurrence of frost would be rapidly followed by a decided fall in pressure with increased cloudiness, thereby preventing the occurrence of frost for which warnings had been

ordered. The principal frost of the month was not forecast because the previous conditions over the territory affected indicated cloudy weather and rain, whereas exactly the reverse occurred owing to the rapid 12-hour movement of a low-pressure area in the northeast and the equally rapid development of a cold high area in its rear.

STORM WARNINGS.

Comparatively few small-craft warnings were ordered during the month, except on the Gulf coast. On the night of the 2d a western disturbance had reached western Iowa with increased intensity and with a moderately strong high area to the northeastward; northeast and southeast storm warnings were therefore ordered at 9.45 p. m. for the Great Lakes from Duluth to Toledo, but pressure distribution on the following morning indicated that they were no longer needed, and they were therefore lowered at 9:30 a. m., with no high winds reported, except a moderate northeast gale on extreme western Lake Superior. On the evening of the 6th a pronounced disturbance from the extreme southwest was central over southeast Texas, and southeast storm warnings were ordered at 10 p. m. on the Gulf coast from Mobile to Cedar Keys. Only fresh winds occurred, but the warnings were displayed for the full 24 hours, as the future development and course of the disturbance were not clearly indicated.

On the morning of the 7th the northern portion of a southwestern disturbance was central over Lake Superior with greatly increased development, and southwest warnings were ordered at 9:30 a. m. for the northern and eastern upper Lake region and the Lower Lakes. As special observations indicated a future increase in intensity of the storm, southwest warnings were also ordered on the Atlantic coast from Delaware Breakwater to Boston. Here again there was a rapid change in conditions, and on the morning of the 8th the warnings on the Atlantic coast were lowered. In the meantime, however, strong winds had occurred in the Lake region, so that the warnings for this section may be considered as having been justified. Nothing further developed until the 11th, when a disturbance from the mouth of the Rio Grande was central over extreme southwestern Alabama. There were indications of further development to the northeastward where pressure was high, and southeast storm warnings were therefore ordered at 9:45 a. m. from Pensacola to Cedar Keys and northeast warnings on the Atlantic coast from Tybee Island to Hatteras. Some high winds occurred on the northwest Florida coast, but the storm failed to develop to the northeastward and all warnings were ordered down at 9 p. m. of the 11th.

On the morning of the 14th middle Plateau depression was central over northwestern Nebraska. Special observations at 1 p. m. indicated a further increase in intensity, and, as there was a strong gradient to the northeastward, northeast storm warnings were ordered at 3 p. m. over western Lake Superior and along the western shore of northern Lake Michigan. There was no further development, however, and at 9 p. m. the

warnings were ordered down, except on extreme western Lake Superior. On the morning of the 15th there was a redevelopment of the western disturbance, and it was then central over northwestern Iowa. Special observations were obtained at 1 p. m., and as conditions at that time indicated the further display of warnings, northeast warnings were therefore ordered on Lake Superior from Duluth to Ashland. This warning was verified, Duluth reporting a maximum velocity of 44 miles from the northeast during the night of the 15-16th. Warnings were also ordered on the morning of the 16th for the eastern shore of northern Lake Michigan and for Lake Huron as far south as Tawas Point. This warning was ordered because a secondary disturbance still persisted over southwest Wisconsin, and during the day strong winds occurred over the portions of the district covered by the warnings. They were, however, ordered down at 9 p. m., as the storm had passed rapidly to the eastward.

Special observations at 1 p. m. of the 18th indicated the movement of a middle Plateau low toward the Texas coast, and southeast warnings were therefore ordered for that vicinity, and extended at 10:30 p. m. eastward along the Gulf coast to Apalachicola. Strong winds occurred on the Texas coast, but none to the eastward, and at 3 p. m. of the 19th the warnings on the coast from Louisiana eastward were lowered. On the morning of the 21st another disturbance from the far West was central over northeast Iowa with well-defined formation, and northeast warnings were ordered on Lake Superior and southeast warnings on the western shore of northern Lake Michigan. Small-craft warnings were also ordered at the same time for the balance of Lake Michigan,

except Chicago, and for Lake Huron. At 3 p. m. of the same date southwest warnings were ordered from Port Huron to Oswego, but by the following morning the storm conditions had practically disappeared, and the warnings were lowered at 9 a. m. Over the Upper Lakes, however, moderately strong winds had occurred, but they were of very brief duration. No further warnings were ordered until the 27th, when a strong gradient, caused by marked high pressure over the Lake region, indicated increasing northeast winds on the south Atlantic coast, and warnings were therefore ordered at 11:30 a. m. from Fort Monroe to Savannah. Quite a strong northeast gale prevailed for a short time, but at 9 p. m. the warnings were lowered, as pressure had fallen rapidly and decidedly to the northward.

FROST WARNINGS.

Frost warnings were necessary over some portions of the country during 24 days of the month, and, as a rule, the frosts occurred as forecasted, the only notable failure having been the one of May 27 in the Upper Lake Region and interior New York. At different times during the first 20 days of the month warnings of freezing temperature were necessary for portions of the West, especially the Plains States and the central Rocky Mountain Region, and temperatures as low as 22° occurred over the latter district, accompanied by heavy snow that extended for a considerable distance along the eastern slope of the mountains. The last general frost warning was issued on the 29th for the North Pacific States, while on the 30th and 31st warnings were issued for the cranberry districts of Wisconsin, New England, and New Jersey.